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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,020

05/14/2007

Berndt Cramer

10191/4850

5721

26646 7590 03/29/2010
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EXAMINER

THAI, SUSAN

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

03/29/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,020	Applicant(s) CRAMER ET AL.	
	Examiner SUSAN THAI	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>20090922</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. The amendment filed on 01/25/2010 is acknowledged. Currently claims 1-15 are cancelled and 16-30 are pending in this application.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 16-23 and 29-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Makino et al. (US5676811).

Regarding **claim 16**, Makino discloses a sensor element for determining the concentration of oxygen in a combustion engine (abstract and C1/L11-17) comprising: a solid electrolyte body (See Fig. 18, where the solid electrolyte body is considered the area encompassing layer 35 to layer 38); an external electrode (7) exposed to the target gas component situated in a first cavity formed in the solid electrolyte body (see Fig. 18 and Fig. 19, where the first cavity is considered the area where electrode 7 resides); an internal electrode situated in the solid electrolyte body (see Fig. 18); an electrical resistance heater (15) embedded in an electrical insulation (16 and 14) (C4/L57-63), wherein the electrical resistance heater and the electrical insulation are situated inside the solid electrolyte body (see Fig. 18), and wherein the heater has a meander-shaped heating surface (See Fig. 18 and 19, a meander shape is inherent); and a second cavity (17) formed in the solid electrolyte body on an opposite side of the solid electrolyte body

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from the first cavity, the electrical resistance heater being situated between the first cavity and second cavity (see Fig. 18).

Regarding **claim 17**, Makino discloses all the limitations as set forth above and further discloses wherein the external electrode is situated on the bottom of the first cavity facing away from the outside of the solid electrolyte body (see Fig. 18).

Regarding **claim 18**, Makino discloses all the limitations as set forth above and further discloses wherein the first cavity has an opening to the outside, and wherein the opening is covered by a first cover (10) (see Fig. 18).

Regarding **claim 19**, Makino discloses all the limitations as set forth above and further discloses wherein the first cover is comprised of a gas-permeable, porous material that covers the first cavity (C4/L39-46 and see Fig. 18).

Regarding **claim 20**, Makino discloses all the limitations as set forth above and further discloses wherein at least one gas passage hole leading to the first cavity is provided (see Fig. 18),

Regarding **claim 21**, Makino discloses all the limitations as set forth above and further discloses wherein the at least one gas passage hole is incorporated in one of the solid electrolyte body or in the first cover (see fig. 18).

Regarding **claim 22**, Makino discloses all the limitations as set forth above and further discloses wherein the second cavity extends over the area of the heating surface (see Fig. 18).

Regarding **claim 23**, Makino discloses all the limitations as set forth above and further discloses wherein the second cavity (17) is provided from the outer side of the

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solid electrolyte body facing away from the external electrode (7), and wherein the second cavity is covered by a second cover (11) (see Fig. 18).

Regarding **claim 29**, Makino discloses all the limitations as set forth above and further discloses wherein the sensor element is for a wideband lambda sensor (C1/L22-32), and wherein the internal (8) and external (7) electrodes form a pump cell (2), and wherein a reference gas channel (19) (C5/L2-4) and a test gas chamber are formed in the solid electrolyte body, the test gas chamber being connected to the first cavity via a diffusion barrier (10), and wherein the test gas chamber houses the internal electrode (8) and one of the test electrode (12) and wherein a reference electrode (13) is situated within the reference gas channel (19) (see Fig. 18).

Regarding **claim 30**, Makino discloses all the limitations as set forth above and further discloses wherein the first and second cavities extend over regions of the internal electrode, the external electrode, the one of the test electrode and the reference electrode (see Fig. 18).

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al. (US5676811) as applied to claim 16 above in view of Allen (US6652987).

Regarding **claim 24**, Makino discloses all the limitations as set forth above. Makino, however, does not explicitly disclose where the bottom surface of the second cavity opposite the second cover is provided with a coating having low emissivity.

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Allen discloses a method for forming an article having protective coating with reduces the radiation heat transport (abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the sensor of Makino by including the low emissivity coating of Allen because it reduces radiation heat transfer as well as the radiative contribution to the overall heat transfer (C2/L5-11).

Regarding **claim 25**, modified Makino discloses all the limitations as set forth above and Allen further discloses that the coating is made of a high-melting noble metals or oxides of high-melting noble metals (C3/L11-20, yttria inherently has a high melting point).

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al. (US5676811) as applied to claim 23 as further evidenced by Patrick et al. (US6254750).

Regarding **claim 26**, modified Makino discloses all the limitations as set forth above and Makino further discloses a porous ceramic cover (10).

While the reference does not disclose wherein at least one of the first and second cavity is filled with a highly porous ceramic, it would have been obvious to one having ordinary skill in the art at the time the invention was made to place the porous ceramic cover (10) used to cover the outer surfaces of the electrodes in a way to fill either the first or second cavity as an additional filtering precaution to extend the life of the sensor (as further evidenced by Patrick C2/L5-31). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See

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KSR International Co. v. Teleflex Inc., 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, A.).

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al. (US5676811) as applied to claim 23 in view of Belanger et al. (US4293399).

Regarding **claim 27**, modified Makino discloses all the limitations as set forth above and Makino further shows that the sensor is held together (see Fig. 18).

Makino, however, does not explicitly disclose where braces are positioned in each of the first and second cavities to brace the first cover and the second cover against the bottom of the corresponding first and second cavities.

Belanger discloses a gas sensor where braces and bolts are used as fixation means. Belanger further teaches that other methods of fixation can be used.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the fixation Makino by using the braces of Belanger because

the simple substitution of one known element for another is likely to be obvious when predictable results are achieved. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, B.).

8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Makino et al. (US5676811) as applied to claim 23 in view of Friese et al. (US4293399).

Regarding **claim 28**, modified Makino discloses all the limitations as set forth above. Makino, however, does not explicitly disclose that the first and second covers are made of a material having a higher thermal coefficient of expansion than a material of the solid electrolyte body.

Friese discloses a gas sensor (abstract). Friese further discloses the cover layer has a thermal expansion coefficient of approximately $\pm 2 \times 10^{-6} \text{ K}^{-1}$ to the thermal expansion coefficient of the solid electrolyte body (C5/L22-28).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the thermal expansion coefficient of the covers of Makino by including the approximately $\pm 2 \times 10^{-6} \text{ K}^{-1}$ to the thermal expansion coefficient of Friese because it has been shown to be advantageous as well as providing a positive effect on the layer adhesion (C2/L43-56 and C5/L22-28).

Response to Arguments

9. Applicant's arguments with respect to claims 16-30 have been considered but are moot in view of the new ground(s) of rejection.

With respect to applicant's argument of meander, the examiner understood meandering as following a winding path or course (see Merriam-Webster online dictionary definition). As shown in Fig. 19 of Makino, the heater has a meander shape according to the definition provided.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN THAI whose telephone number is (571)270-1487. The examiner can normally be reached on Monday-Thursday, 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Nam X Nguyen/

Supervisory Patent Examiner, Art Unit 1753

/SUSAN THAI/

Examiner, Art Unit 1795